SIAM Conference on Applied Linear Algebra (SIAM-ALA18) ● 4-8 May 2018 ● Hong Kong Baptist University

MS06 Discovery from Data ● 5-7 May 2018 ● Tsang Chan Sik Yue Auditorium, 2/F Academic and Administration Building

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The number of large-scale high-dimensional datasets recording different aspects of interrelated phenomena is growing, accompanied by a need for mathematical frameworks for discovery from data arranged in structures more complex than that of a single matrix. In the three sessions of this minisymposium we will present recent studies demonstrating "Discovery from Data," in "I: Systems Biology," and "II: Personalized Medicine," by developing and using the mathematics of "III: Tensors."

I: Systems Biology ● 5 May 2018

10:45am–11:15am	Patterns of DNA Copy-Number Alterations Revealed by the GSVD and Tensor GSVD Encode for Cell Transformation and Predict Survival and Response to Platinum in Adenocarcinomas *Orly Alter,*[1] *Sri Priya Ponnapalli,*[1] *Heidi A. Hanson*[1] [1]University of Utah
11:15am–11:45am	Systems Biology of Drug Resistance in Cancer *Antti Hakkinen,*[1] *Sampsa Hautaniemi*[1] [1]University of Helsinki
11:45am–12:15pm	Single-Cell Entropy for Estimating Differentiation Potency in Waddington's Epigenetic Landscape *Andrew E. Teschendorff*[1] [1]Shanghai CAS-MPG Computational Biology Institute and University College London
12:15pm-12:45pm	Dimension Reduction for the Integrative Analysis of Multilevel Omics Data *Gerhard G. Thallinger,*[1] *Bettina Pucher,*[1] *Natascha Fladischer,*[1] *Oana A. Zeleznik*[2] [1]Graz University of Technology, [2]Harvard Medical School

II: Personalized Medicine ● 6 May 2018

1:45pm– 2:15pm	Mathematically Universal and Biologically Consistent Astrocytoma Genotype Encodes for Transformation and Predicts Survival Phenotype *Sri Priya Ponnapalli,*[1] *Orly Alter*[1] [1]University of Utah
2:15pm– 2:45pm	Statistical Methods for Integrative Clustering Analysis of Multi-Omics Data *Qianxing Mo*[1] [1]Baylor College of Medicine
2:45pm– 3:15pm	Structured Convex Optimization Method for Orthogonal Nonnegative Matrix Factorization with Applications to Gene Expression Data *Junjun Pan,*[1] *Michael Ng*[1] [1]Hong Kong Baptist University
3:15pm– 3:45pm	Mining the ECG Using Low Rank Tensor Approximations with Applications in Cardiac Monitoring *Sabine Van Huffel*[1] [1]KU Leuven

III: Tensors ● 7 May 2018

10:35am–11:05am	Tensor Higher-Order GSVD: A Comparative Spectral Decomposition of Multiple Column-Matched but Row-Independent Large-Scale High-Dimensional Datasets *Sri Priya Ponnapalli,*[1] *Orly Alter*[1] [1]University of Utah
11:05am–11:35am	The GSVD: Where are the Ellipses? *Alan Edelman,*[1] *Yuyang Wang*[2] [1]Massachusetts Institute of Technology, [2]Amazon AI
11:35am–12:05pm	Tensor Convolutional Neural Networks (tCNN): Improved Featurization Using High-Dimensional Frameworks *Elizabeth Newman,*[1] *Lior Horesh,*[2] *Haim Avron,*[3] *Misha E. Kilmer*[1] [1]Tufts University, [2]IBM TJ Watson Research Center, [3]Tel Aviv University
12:05pm–12:35pm	Three-way Generalized Canonical Correlation Analysis *Arthur Tenenhaus,*[1] *Arnaud Gloaguen,*[2] *Laurent Le Brusquet,*[2] *Cathy Philippe,*[2] *Vincent Frouin*[2] [1]CentraleSupélec, [2]NeuroSpin